REMARKS

Claims 34-43 have been canceled without prejudice. New claims 44-45 have been added. Claims 24-33 and 44-45 are pending. Reexamination and allowance of the pending claims is respectfully requested.

First, the Section 112 rejection is now moot because claims 34-43 have been canceled.

Claims 24-27, 32-37, 42 and 43 stand rejected under 35 U.S.C. 102(e) as being anticipated by USP 6,375,062 to Higdon et al. ("Higdon"). Claims 28, 29, 38 and 39 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Higdon in view of USP 6,387,734 to Inaba et al. ("Inaba"). Claims 30, 31, 40 and 41 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Higdon in view of Inaba, and further in view of USP 3,958,048 to Donovan et al. ("Donovan"). These rejections are respectfully traversed.

Claim 24 is the only pending independent claim. Original independent claim 24 recites a method of forming electroplated solder on an organic circuit board using the steps outlined in the claim. In contrast, Higdon is not directed to an organic circuit board, but instead discloses a surface bumping method for use on a conventional silicon substrate. As will be explained in greater detail below, there are significant differences between an organic circuit board and a conventional silicon substrate which make it impossible to apply the technology and methods for silicon substrates onto organic circuit boards.

The present invention is directed to "organic" circuit boards. Organic circuit boards are well-known in the art, and examples of the materials used for these organic circuit boards are set forth on page 6, lines 1-7 of the specification. These materials clearly distinguish the nature of the circuit board (or substrate), and are recited in dependent claims 44-45 to further distinguish the silicon substrate of Higdon.

The applicant respectfully submits that there are significant differences between the processes for forming the electroplated solders on a silicon substrate and an organic substrate. It is impossible to employ the techniques and processes of silicon substrate directly to an organic substrate. First, it is noted that the passivation layer formed on the silicon substrate (such as disclosed in Higdon) is made of silicon oxide or silicon nitride, which are capable of being

exposed to high temperature and acid/alkali environments. However, solder masks used on an organic substrate are made of light-sensitive epoxy resin or acrylic resin, which cannot tolerate high temperature or high acid/alkali environments. Thus, application of the high temperatures and acid/alkali environments used for the silicon substrate will destroy the organic substrate.

Second, the semiconductor processes, chemical solutions and conditions of manufacturing used for silicon substrates are very different from the manufacturing processes, conditions and chemical solutions of the electroplated solders for the organic substrate. For example, the chemical solutions used for silicon substrates would attack the organic substrate.

Thus, a person skilled in the art would readily recognize that the techniques and processes used for silicon substrates cannot be applied to organic circuit boards. For this reason, claim 24 is distinguishable from Higdon, and claim 24 (and claims 25-33 and 44-45 depending therefrom) are in condition for allowance.

The above points were discussed in a phone interview conducted between the undersigned and the Examiner on October 7, 2004. The Examiner suggested that Applicant review column 1, lines 23-25 of Higdon. In this regard, column 1, lines 23-25 disclose a ceramic substrate (which has the same properties as a silicon substrate, and is therefore not organic) and "other substrates". Applicant respectfully submits that a person skilled in the art would not interpret the "other substrates" as encompassing an organic substrate because of the different properties mentioned above. In addition, the fact that ceramic was mentioned in this text would further teach away from organic substrates because ceramic substrates and silicon substrates share the same properties.

In addition, the most common method for formation of pre-solder bumps on the circuit board is the stencil printing method. According to practical experiences, the stencil printing will become infeasible once the bump pitch is decreased below ~0.15 millimeters. In contrast, the solder bumps deposited by electroplating offers the ability to further reduce bump pitch down to below 0.15 millimeters. The present invention discloses an electroplating process for fabricating solder bumps on the contact pads of the organic circuit board, which offers good plating and fine bump pitch. However, in light of this, column 1 of Higdon does not disclose electroplating "bumps" on an organic circuit board, as

recited in claim 24.

Finally, claims 44-45 are submitted to define additional patentable subject matter since Higdon does not teach or remotely suggest the provision of insulative layers that include the recited materials.

In light of these reasons, it is respectfully submitted that all pending claims are in condition for allowance. The Examiner is encouraged to telephone the undersigned if there are informalities that can be resolved in a phone conversation, or if the Examiner has any ideas or suggestions for further advancing the prosecution of this case.

Respectfully Submitted,

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CERTIFICATE OF MAILING

I hereby certify that this paper and its enclosures are being deposited with the United States Postal service as First Class Mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

Date: October 15, 2004 By: _____
Raymond Sun